UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,912	02/08/2001	Neil Singer	0162095-0011	6500

7590 08/15/2003

Sam Pasternack
Choate, Hall & Stewart
53 State Street
Exchange Place
Boston, MA 02109

EXAMINER	
WONG, KIN C	
ART UNIT	**PAPER NUMBER**
2651	9

DATE MAILED: 08/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/779,912	SINGER, NEIL	
	Examiner	Art Unit	
	K. Wong	2651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 September 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *1* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

This application, filed under former 37 CFR 1.60, lacks formal drawings. The informal drawings filed in this application are acceptable for examination purposes. When the application is allowed, applicant will be required to submit new formal drawings. In unusual circumstances, the formal drawings from the abandoned parent application may be transferred by the grant of a petition under 37 CFR 1.182.

Claim Objections

Claims (29 and 58) objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claims (14 to 28 and 43 to 57), respectively. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claims (30-58 and 61) are objected to because of the following informalities: the apparatus claims recite a phrase "process steps" which is a legal phraseology and has its restrictions in their usage; furthermore, this phrase is also mixed within the recitations of an apparatus claims. The examiner suggests an alternative phrase "instruction" for the objected phrase. Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claim 60 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Line 4 of claim 60 contains a term ") t" that is indefinite and fails to particularly point out the distinct claim subject matter. Moreover, the instant specification on page 32, line 6 also fails the distinct the claim subject matter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims (1-8, 10-37, 39-58 and 61) are rejected under 35 U.S.C. 102(b) as being anticipated by Takaishi (5859742).

Regarding claim 30: Takaishi discloses a data storage device which uses a position-velocity table (or seek profile or speed table or velocity profile – as depicted in figure 8 of Takaishi) to control movement of a component (head disk assembly – HAD) of the data storage device, the data storage device (as depicted in figure 3 of Takaishi) including:

a memory (elements 26 and 28 in figure 3) which stores the position-velocity table and computer-executable process steps (see col. 28, lines 41-50); and a processor (element 24 in figure 3) which executes the process steps stored in the memory so as (i) to generate a position variable for the component (see col. 12, lines 23-29 of Takaishi), (ii) to determine a velocity command for the component using the position-velocity table (see col. 12, line 35 to col. 13, line 2 of Takaishi), the processor

determining the velocity command based on the position variable (see col. 12, lines 49-59 of Takaishi), (iii) to shape the velocity command in order to generate a shaped velocity command (see col. 12, lines 24-34 of Takaishi) , and (iv) to control the component to move based on the shaped velocity command (see col. 12, line 24 to col. 13, line 50 of Takaishi).

Regarding claim 31: Takaishi depicts in figure 3 that wherein the component comprises a head of the data storage device; and wherein the processor controls the head to move among various tracks of a data recording medium in the data storage device.

Regarding claim 32: Takaishi A data storage device according to claim 30, wherein, to generate a position variable for the component, the processor compares a preset position of the component to a measured position of the component; and wherein the processor further performs inverse shaping on the measured position prior to comparing the measured position to the preset position (in col. 24, line 48 to col. 25, line 14 of Takaishi).

Regarding claim 33: Takaishi depicts in figure 34A-34-F that wherein the shaping and inverse shaping performed by the processor reduce unwanted vibrations resulting from movement of the component.

Regarding claim 34: Takaishi depicts that wherein the processor determines the measured position of the component after controlling the component; and wherein the processor uses a previously-measured position of the component to determine the position variable.

Regarding claims 1-5: method claims (1-5) are drawn to the method of using the corresponding apparatus claimed in claims (30-34). Therefore method claims (1-5) correspond to apparatus claims (30-34) and are rejected for the same reasons of anticipation as used above.

Regarding claim 35: Takaishi discloses an apparatus which generates a trajectory (seek) for inclusion in a position-velocity table (or seek profile or speed table or velocity profile- as depicted in figure 8 Takaishi) that is used in to control a dynamic system, the apparatus including:

a memory (elements 26 and 28 in figure 3) which stores computer-executable process steps and a position-velocity table having N (N>2) dimensions (as depicted in figure 8); and

a processor (element 24 in figure 3) which executes the process steps stored in the memory so as (i) to generate a trajectory for the system (see col. 28, lines 41-50 of Takaishi), the trajectory defining system velocity in terms of system position and one or more additional variables, (ii) to store the trajectory in the position-velocity table (as depicted in figure 8), and (iii) to control the system in accordance with the trajectory stored in the position-velocity table (see col. 2, lines 21-30 of Takaishi).

Regarding claim 36: Takaishi depicts in figure 3 that wherein the apparatus controls a component of the dynamic system, the component comprising a head of a data storage device; and wherein the processor controls the head to move among various tracks of a data storage medium in the data storage device (see col. 9, line 47 to col. 10, line 36 of Takaishi).

Regarding claim 37: Takaishi teaches that wherein one of the variables comprises a desired movement distance of the component (in col. 1, line 62 to col. 3, line 1 of Takaishi).

Regarding claims 6-8: method claims (6-8) are drawn to the method of using the corresponding apparatus claimed in claims (35-37). Therefore method claims (6-8) correspond to apparatus claims (35-37) and are rejected for the same reasons of anticipation as used above.

Regarding claim 39: Takaishi discloses an apparatus which controls a dynamic system in accordance with a variation in a system variable (see col. 1, line 62 to col. 3, line 1 of Takaishi), the apparatus including:

a memory (elements 26 and 28 in figure 3) which stores a position-velocity table and computer-executable process steps (or program or instructions – see col. 9, lines 62-65 of Takaishi); and

a processor (element 24 in figure 3) which executes the process steps stored in the memory so as (i) generate a plurality of trajectories defining velocity in terms of position (see col. 28, line 41 to col. 19, line 22 of Takaishi), the plurality of trajectories being generated in accordance with at least one system variable (see col. 2, lines 21-30 of Takaishi), (ii) to store the plurality of trajectories in the position-velocity table (as depicted in figure 8), (iii) to detect a value of the at least one system variable (see col. 30, line 54 to col. 32, line 22 of Takaishi), and (iv) to control the dynamic system in accordance with both the detected value of the system variable and the trajectories stored in the position-velocity table (see col. 32, lines 16-22 of Takaishi).

Regarding claim 40: Takaishi depicts in figure 8 that wherein the position-velocity table comprises a series of trajectories corresponding to various component movement distances; and wherein the processor controls a component of the dynamic system by selecting one of the trajectories from the position-velocity table based on the detected value of the system variable and by controlling the component in accordance with the selected trajectory (see col. 12, lines 35-59 of Takaishi for details).

Regarding claim 41: Takaishi teaches that wherein the processor controls a component of the dynamic system by generating a function based on the plurality of trajectories and the system variable, by determining a single trajectory (or one track) for the component based on the function, and by controlling the component based on the single trajectory (in col. 17, line 55 to col. 18, line 18 of Takaishi).

Regarding claim 42: Takaishi teaches that wherein the processor generates the plurality of trajectories by (i) estimating system parameters, the system parameters relating to movement of a component of the dynamic system, (ii) determining whether the system parameters have varied from predetermined system parameters, (iii) modifying the trajectories based on determined system parameter variations, and (iv) storing the modified trajectories in the position-velocity table (see col. 18, line 19 to col. 21, line 9 of Takaishi).

Regarding claims 10-13: method claims (39-42) are drawn to the method of using the corresponding apparatus claimed in claims (39-42). Therefore method claims (10-13) correspond to apparatus claims (39-42) and are rejected for the same reasons of anticipation as used above.

Regarding claim 43: Takaishi discloses an apparatus for generating a trajectory (seek) for inclusion in a position-velocity table (or seek profile or speed table or velocity profile -as depicted in figure 8 of Takaishi) which is used in controlling a dynamic system (head disk assembly - HDA), the apparatus including:

a memory (elements 26 and 28 in figure 3) which stores the position-velocity table and computer-executable process steps (or programs or instructions – see col. 9, lines 62-65 of Takaishi); and

a processor (element 24 in figure 3) which executes the process steps stored in the memory so as (i) to generate a trajectory for the system (see col. 28, lines 41-50 of Takaishi), (ii) to store the trajectory in the position-velocity table (speed table – elements 26/28 in figure 3), and (iii) to control the system in accordance with the trajectory stored in the position-velocity table (see col. 28, line 41 to col. 19, line 22 of Takaishi); wherein the processor generates the trajectory in accordance with a technique for reducing unwanted vibrations in the system (see col. 2, lines 21-30 of Takaishi).

Regarding claim 44: Takaishi depicts in figure 3 that wherein the apparatus controls a component of the dynamic system, the component including a head of a data storage device; and wherein the processor controls the head to move to among various tracks of a magnetic disk in the disk drive (see col. 9, line 47 to col. 10, line 36 of Takaishi).

Regarding claim 45: Takaishi teaches that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory by taking into

account both a system vibration limiting constraint and a system sensitivity constraint (in col. 2, lines 22-30; col. 7, lines 28-31 and col. 17, line 35 to col. 19, line 45 of Takaishi).

Regarding claim 46: Takaishi teaches that wherein the system vibration limiting and sensitivity constraints reduce vibration during movement of the component by less than 100% (in col. 12, lines 35-59 of Takaishi).

Regarding claim 47: Takaishi teaches that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory by taking into account one or more constraints which are a function of a movement distance of the component (in col. 1, line 62 to col. 3, line 1 of Takaishi).

Regarding claim 48: Takaishi teaches that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory by taking into account a system vibration limiting constraint only (in col. 2, lines 24-30 and col. 2, lines 60-65 of Takaishi).

Regarding claim 49: Takaishi depicts in figures 42A-42E that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory based on an input which has been shaped in accordance with a predetermined shaping function.

Regarding claim 50: Takaishi depicts in figures 34A-34F that wherein the input includes both transient portions and a steady state portion; and wherein only the transient portions of the input have been shaped in accordance with the predetermined shaping function.

Regarding claim 51: Takaishi teaches that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory by filtering a predetermined trajectory using filters having zeros which are substantially near poles of the system (in col. 3, lines 6-8 of Takaishi).

Regarding claim 52: Takaishi teaches that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory by taking into account at least one of constraints relating to system thermal limits, system current limits, and system duty cycle (in col. 1, line 62 to col. 2, line 65 of Takaishi).

Regarding claim 53: Takaishi teaches that wherein the technique for reducing unwanted movement of the component comprises the steps of: determining whether a trajectory excites greater than a predetermined level of vibrations in the system; and applying input shaping to the trajectory only in a case that the trajectory excites greater than the predetermined level of vibrations (in col. 17, line 35 to col. 18, line 51 of Takaishi).

Regarding claim 54: Takaishi teaches that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory based on a Posicast input(in col. 24, line 51 to col. 25, line 14; also is in line with the instant specification on page 46, line 17-18).

Regarding claim 55: Takaishi depicts in figures 37A-37E that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory based on a symmetric input.

Regarding claim 56: Takaishi depicts in figures 42A-42E that wherein the technique for reducing unwanted vibrations of the component comprises generating the trajectory based on a symmetric constraint that varies as a function of at least one of time and component position.

Regarding claim 57: Takaishi teaches wherein the technique for reducing unwanted vibrations of the component comprises generating a trajectory in accordance with a voltage which has been controlled by controlling current (in col. 17, line 43 to col. 18, line 51 of Takaishi).

Regarding claim 58: the limitations of wherein the processor generates the trajectory by (i) identifying system parameters in real-time, and (ii) modifying the trajectory in real-time in accordance with the system parameters identified by the processor are considered inherent because Takaishi discloses an observer control (in col. 20, line 19-29) which is an inherent knowledge that a real-time system is merely a system which a processor (or a computer) and/or a software system that would react to an events before the events become obsolete.

Regarding claim 61: Takaishi depicts in figure 8 that wherein the position-velocity table comprises a non-dimensional position velocity table.

Regarding claims 14-29: method claims (14-29) are drawn to the method of using the corresponding apparatus claimed in claims (43-58 and 61). Therefore method claims (14-29) correspond to apparatus claims (43-58 and 61) and are rejected for the same reasons of anticipation as used above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims (9, 38 and 59-60) are rejected under 35 U.S.C. 103(a) as being unpatentable over Takaishi (5859742) in view of Ho et al (6115203).

Regarding claims 9, 38 and 59-60: Although Takaishi discloses models of the dynamic system (HDA for a disk drive) as noted in above rejections. Takaishi fails to mention a partial fraction expansion for reducing unwanted vibrations (or frequencies) in the noted dynamic system above. Ho et al is relied for the teachings of the partial fraction expansion for unwanted vibrations (frequencies) – see col. 5, line 65 to col. 7, line 5 of Ho et al.

It would have been obvious to one ordinary skill in the art at the time of the invention was made to modify the modeling of Takaishi with the partial fraction expansion as taught by Ho et al. the rationale is as follows: one ordinary skill in the art would have been motivated to provide a reduction of track misregistration as suggested in col. 7, lines 60-63 of Ho et al.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ho et al (6292324) and Tuttle et al (6505085) are cited for partial fraction expansion in the disk drive. Microsoft Press Computer Dictionary is cited for defining real-time and real-time system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Wong whose telephone number is (703) 305-7772.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Hudspeth can be reached on (703) 308-4825. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for all communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

kw

10 Aug 03

Regina N. Holder

REGINA N. HOLDER
PRIMARY EXAMINER